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(चौथा पुनरीक्षण)

Indian Standard

WROUGHT ALUMINIUM AND ALUMINIUM ALLOYS FOR MANUFACTURE OF UTENSILS — SPECIFICATION

(Fourth Revision)

Second Reprint MAY 2007
(Including Amendment 1)

UDC 669·71-13 : 643·35

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

November 1992 Price Group 2

Light Metals and Their Alloys Sectional Committee, MTD 7

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Light Metals and Their Alloys Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first issued in 1950 as a Tentative standard and confirmed and revised in 1953. The standard was subsequently revised in 1959 and 1975. Since then a number of aluminium alloys have been developed and among them wrought aluminium of designation 19600 and wrought aluminium alloy of designation 64430 have been found suitable for manufacture of utensils. It has, therefore, been considered advisable to revise this standard to incorporate these new designations. The choice, however, depends upon the end use, the type of utensils and the methods of manufacture adopted. In addition to above following modifications have also been made in this revision:

a) A new clause on references has been incorporated, and

b) Marking clause has been modified.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 MAY 2002
TO
IS 21 : 1992 WROUGHT ALUMINIUM AND ALUMINIUM ALLOYS FOR MANUFACTURE OF UTENSILS — SPECIFICATION

(Fourth Revision)

(*Page* 1, *clause* **4.1.1**) — Delete.

(*Page* 2, *Table* 1) — Substitute the following table for the existing:

Table 1 Chemical Composition of Wrought Aluminium and Aluminium Alloys for Manufacture of Utensils

(*Clause* 4.2)

(Composition limits are in percent maximum unless shown otherwise)

Designation	Aluminium	**Copper**	**Magnesium**	**Silicon**	**Iron**	**Manganese**	**Zinc**	**Titanium and/or Other Grain Refining Elements**	**Chromium**	**Remarks**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(1)	(11)
19000	99.0 *Min*	0.1	0.2	0.5	0.6	0.1	0.1	—	—	Cu+Mg+Si+Fe+Mn+Zn=1.0
19500	99.5 *Min*	0.05	-	0.3	0.4	0.05	0.1	—	—	Cu+Si+Fe+Mn+Zn=0.5
19600	99.6 *Min*	0.05	-	0.25	0.35	0.03	0.06	—	—	Cu+Si+Fe+Mn+Zn=0.4
31000	Remainder	0.1	0.1	0.6	0.7	0.8-1.5	0.2	0.2	0.2	—
31500	Remainder	0.2	0.6-1.3	0.4	0.7	1.0-1.5	0.2	0.2	—	—
40800	98.0 *Min*	0.2	0.1	0.6-0.95	0.6-0.95	0.1	0.2	0.2	—	—
51000-A	Remainder	0.2	0.5-1.1	0.6	0.7	0.2	0.25	—	0.1	—
51000-B	Remainder	0.2	1.1-1.8	0.6	0.7	0.2	0.25	—	0.1	—
64430	Remainder	0.1	0.4-1.2	0.6-1.3	0.6	0.4-1.0	0.1	0.2	0.25	—

NOTES

1 The lead content of the material shall not exceed 0.05%.

2 It is the responsibility of the supplier to ensure that any element not specifically limited is not present in any amount such as is generally accepted as having an adverse effect on the product. If a purchaser's requirements necessitate limits for any element not specified, it should be agreed between the purchaser and the supplier.

(MTD 7)

Indian Standard

WROUGHT ALUMINIUM AND ALUMINIUM ALLOYS FOR MANUFACTURE OF UTENSILS — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard covers the requirements for wrought aluminium and aluminium alloys used for manufacture of utensils.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard.

IS No.	*Title*
737 : 1986	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*third revision*)
10259 : 1982	General condition of delivery and inspection of aluminium and aluminium alloy products

3 SUPPLY OF MATERIAL

General requirements relating to the supply of material shall conform to IS 10259 : 1982.

4 MATERIAL

4.1 Wrought aluminium or aluminium alloys used for the manufacture of utensils shall comply with the requirements of one of the following grades specified in IS 737 : 1986.

19000, 19500, 19600, 31000, 31500, 40800, 51000-A, 51000-B and 64430.

4.1.1 In addition, the lead content of the material shall not exceed 0·05 percent.

4.1.2 The aluminium content for grades 19000, 19500, 19600 and 40800 shall be determined by difference.

4.2 The chemical composition and mechanical properties of the grades referred in **4.1** have been reproduced from IS 737 : 1986 in Tables 1 and Table 2 respectively.

5 MARKING

5.1 Each package or coil shall be suitably marked with the following details:

a) batch/lot number,

b) grade and condition, and

c) indication of the source of manufacture.

5.2 Each package or coil may also be marked with the Standard Mark.

6 TEST CERTIFICATE

The supplier shall furnish a certificate with each consignment giving details of grade, condition, batch number and corresponding chemical composition and mechanical properties.

Table 1 Chemical Composition of Wrought Aluminium and Aluminium Alloys for Manufacture of Utensils

(*Clause* 4.2)

(Composition limits are in percent maximum unless shown otherwise)

Designation	Aluminium	Copper	Magnesium	Silicon	Iron	Manganese	Zinc	Titanium and/or Other Grain Refining Elements	Chromium	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
19000	99·0 *Min*	0·1	0·2	0·5	0·7	0·1	0·1	—	—	Cu+Mg+Si+
19500	99·5 *Min*	0·05	—	0·3	0·4	0·05	0·1	—	—	Fe+Mn+Zn 1·0
19600	99·6 *Min*	0·05	—	0·25	0·35	0·03	0·06	—	—	Cu+Si+Fe+
31000	Remainder	0·1	0·1	0·6	0·7	0·8-1·5	0·2	0·2	0·2	Mn+Zn=0·5
31500	Remainder	0·2	0·6-1·3	0·4	0·7	1·0-1·5	0·2	0·2	—	Cu+Si+Fe+
40800	98·0 *Min*	0·2	0·1	0·6-0·95	0·6-0·95	0·1	0·2	0·2	—	Mn+Zn=0·4
51000-A	Remainder	0·2	0·5-1·1	0·6	0·7	0·2	0·25	—	0·1	
51000-B	Remainder	0·2	1·1-1·8	0·6	0·7	0·2	0·25	—	0·1	
64430	Remainder	0·1	0·4-1·2	0·6-1·3	0·6	0·4-1·0	0·1	0·2	0·25	

NOTE — It is the responsibility of the supplier to ensure that any element not specifically limited is not present in an amount such as is generally accepted as having an adverse effect on the product. If a purchaser's requirements necessitate limits for any element not specified, it should be agreed between the purchaser and the supplier.

Table 2 Mechanical Properties of Wrought Aluminium and Aluminium Alloys for Manufacture of Utensils

(*Clause* 4.2)

Designation	Condition	0·2 Percent Proof Stress MPa	Tensile Strength MPa		Elongation on 50 mm Gauge Length, Percent For Thickness				Bend Test (Radius of Bend)
		Min	*Min*	*Max*	0·5 to 0·8 mm	Over 0·8 to 1·3 mm	Over 1·3 to 2·6 mm	Over 2·6 to 6·3 mm	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
19000	0	—	70	110	20	25	29	30	Close
	H1	—	90	130	5	6	8	8	Close
	H2	—	105	140	3	4	5	5	1/2 *t*
	H3	—	125	150	2	3	4	4	1/2 *t*
	H4	—	140	—	2	2	3	3	1 *t*
19500	0	—	55	95	22	25	29	30	Close
	H2	—	95	135	4	5	6	6	1/2 *t*
	H4	—	125	—	3	3	4	4	1 *t*
19600	0	—	—	95	25	25	29	32	Close
	H2	—	95	125	4	5	6	6	1/2 *t*
	H4	—	125	—	3	3	4	4	1 *t*
31000	0	—	90	130	20	23	24	24	Close
	H1	—	115	150	5	6	7	8	Close
	H2	—	130	180	3	4	5	5	1/2 *t*
	H3	—	150	195	2	3	4	4	1 *t*
	H4	—	170	—	2	2	3	3	3 *t*
31500	0	—	125	165	16	16	18	20	Close
	H1	—	150	210	5	5	6	8	1/2 *t*
	H2	—	190	245	3	4	5	5	1 *t*
	H3	—	215	275	2	2	3	4	2 *t*
	H4	—	245	—	1	1	1	2	4 *t*
40800	0	—	85	120	20	23	25	30	Close
	H1	—	105	140	5	6	7	8	Close
	H2	—	125	160	3	4	5	5	1/2 *t*
	H3	—	150	180	2	3	4	4	1 *t*
	H4	—	175	—	2	2	3	3	3 *t*
51000-A	0	—	105	150	18	18	18	22	Close
	H1	85	120	160	3	4	5	6	Close
	H2	105	140	180	2	3	4	4	1/2 *t*
	H3	125	160	200	1	2	2	2	1 *t*
	H4	—	185	—	1	2	2	2	3 *t*
51000-B	0	—	125	170	18	18	18	19	Close
	H1	110	155	195	3	4	5	6	1/2 *t*
	H2	140	175	215	2	3	4	4	1 *t*
	H3	155	190	225	1	2	2	2	—
	H4	—	200	—	1	2	2	2	—
64430	0	—	—	175	14	16	16	18	Close
	W	115	200	—	12	15	15	15	2 *t*
	WP	250	295	—	5	5	5	6	3 *t*

t — thickness of sheet

1 MPa = 1 N/mm^2 = 0·102 kgf/mm^2.

NOTE — For thicknesses 2·6 mm and less, elongation values are for guidance only and not guaranteed. For this purpose bend test as specified in 6.3 of IS 737 : 1986 may be carried out.

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